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# Student Guide

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## Introduction

You live in Golden County, an imaginary coastal county in California. The County has decided to protect itself from a future electricity crisis and price spikes by increasing the amount of electricity produced in the county, thus reducing the amount of electricity the county has to import. The County has sent out a notice requesting your presence at a meeting that will determine how this goal will be met.

## Directions

You will assume an assigned role and use the information given to you to help the county achieve its goal of becoming 50% energy self-sufficient by creating **350 million kilowatt hours (KWh) of electricity** from local sources. You must work within the constraints of your role description and along with the other participants to determine how to best meet the goal through electricity generation or conservation projects.

This goal needs to be met by only using projects from Golden County's Tool Box on page 4. You can choose any of the projects on the list, but cannot use any project more than once.

The majority of the players **must** agree on exactly **which** projects are going to be used and **who** is going to pay for each project. In determining who is going to pay for each project you must rely on the information given in each role play, the money that the county has and the art of negotiation to cover all the costs while meeting the goal of 350 million kilowatt hours of electricity. Players can pay for part or all of a project but they **must** have money to spend. Each role explicitly states how much money each role has to work with.

You should consider costs and who bears the costs of each energy project as well as the technical potential and political feasibility of the various options, environmental impacts, and the reliability of the energy source when coming to an agreement.

You have been selected to participate because you have expertise and/or will be affected by the outcome of this plan and therefore it is very important that you prepare for this meeting as best as possible. The more you prepare the more likely you will be to succeed in getting what you want.

## Participants

The following participants must work together to come up with a plan for the county that meets the new mandate to have 50% of the county's energy come from local sources.

### Grover Mint

Grover represents a coalition of government agencies that is primarily concerned with ensuring that all citizens have access to reliable, affordable energy. This coalition Government also wants to minimize environmental damage and enforce all relevant laws.

### Harvey Sterr

Harvey owns AgriFoods, a locally owned and operated food production company that is *heavily* dependent on affordable and reliable energy to make its products. Harvey is concerned with ensuring a reliable and reasonably priced source of energy so that the business can continue to operate, prosper, and stay competitive with other food production companies.

### Eve R. Green

Eve is the head of Citizens for a Cleaner Tomorrow (CCT), a local environmental group that believes the county should rely on electricity that comes from 100% renewable energy sources. They are also *very* concerned about the environmental issues associated with energy use and are against any future oil and natural gas extraction, especially local, offshore production.

### Eli Tricity

Eli is the CEO of Gold Coast Power (GCP), the local energy utility that produces and sells electricity to customers. GCP is owned by stockholders and therefore is responsible for making profits for them. GCP is concerned with maintaining a reliable supply of electricity at prices that customers can afford, but also making adequate profits for their shareholders. GCP is opposed to any plan that would cause them to lose profits.

## About Golden County

Golden County is a coastal county in California with the following characteristics:

Area	1,500 square miles
Population	250,000 people
Length of Coastline	35 miles
Annual Rainfall	15 inches
Average Temperature	60° Fahrenheit
Average Wind Speed	5-7 miles per hour

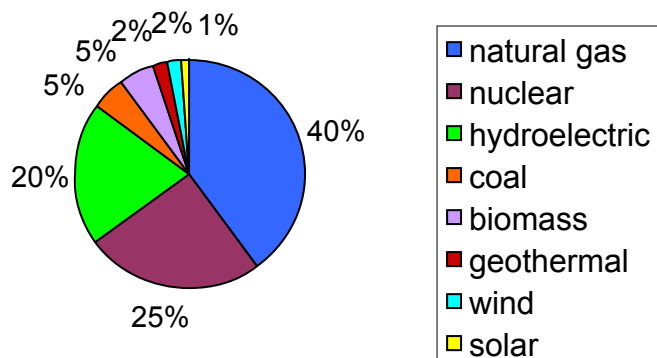
All County residents and businesses purchase their electricity from the local utility, Golden Coast Power (GCP), which is the only electric service provider (ESP) in the area. GCP provides the county with locally generated and imported electricity through a local electricity grid that connects to a larger national grid to access the imported electricity. In light of the recent energy crisis in California — especially the rolling blackouts and

skyrocketing prices — the county planning department has decided to take steps towards making the county more energy self-sufficient. The county has sent out a public notice that it plans to have 50% of its energy come from local sources. The county has scheduled a hearing in two weeks to hear what the various stakeholders think of the plan, and to get public input on how to accomplish this goal.

## Golden County's Energy Use:

Golden County currently uses 1,800 million kilowatt hours of electricity annually and it imports 70% (about 1,250 million kilowatt hours) from outside the county.<sup>1</sup>

**Golden County's Current Electricity Sources**



## Tools

The Tool Box includes all of the potential projects you have to choose from in order to meet the county's goal of **350 million kilowatt hours**. You may use **any** combination of individual projects.

The Energy Packs on the following pages should give you an idea of what to do. The Energy Packs were designed to focus on one issue (environmental safety, cost or reliability) and to give you an idea of how to come up with a potential solution. They are not a complete list of the environmental, cost effective or reliable projects. For example, there are many environmentally friendly projects that were not included in the "environment" Energy Pack in order for it to come as close as possible to 350 million kilowatt hours. The same goes for the other energy packs.

In order to evaluate the pros and cons of each project you should do some research on the various energy sources.

<sup>1</sup> Excludes natural gas used to generate electricity.

## Tool Box

Tool	Project Description	Cost	Electricity Produced (KWh)
<b>Conservation</b>	Distribute pamphlets to encourage the community to turn off the lights when they are not using them.	\$0.04 million	5 million
	Publish ads in the local paper encouraging the community to turn back thermostat 10°-15° in winter and up in summer.	\$ 0.05 million	20 million
<b>Household Efficiency</b>	Give out 12,500 compact fluorescent light bulbs	\$ 1 million	2 million
	Subsidize replacement of 5,000 pre 1993 refrigerators with new efficient ones	\$ 1 million	5 million
<b>Geothermal</b>	Build a geothermal power plant	\$ 2.3 million	10 million
<b>Hydroelectric Dams</b>	Build a new large dam	\$20 million	200 million
<b>Landfill Gas</b>	Build a power plant that runs on landfill gas	\$13 million	80 million
<b>Natural Gas Power Plant Modernization</b>	Install new technology that will increase plant efficiency from 30-50%	\$5 million	20 million
<b>Natural Gas Production</b>	Increase local natural gas production, which can be used to increase electricity production at the local power plant	\$10 million	0.5 million
<b>Solar Photovoltaic</b>	Install a 10,000 KW solar photovoltaic system on County buildings	\$22 million	4 million
	Hold meeting to encourage 3% of residents to install a solar photovoltaic systems	\$0.1 million	55 million
<b>Wind</b>	Install a 10,000 KW onshore wind farm	\$10 million	30 million
	Install a 40,000 KW offshore wind farm	\$48 million	150 million
<b>Total</b>		<b>\$132.5 million</b>	<b>581.5 million</b>

## Energy Pack 1: Environmental Damage Minimization

Tool	Project Description	Project Cost	Amount of Electricity Created Annually (KWh)
<b>Conservation</b>	Publish ads in the local paper encouraging the community to turn back thermostat 10°-15° in winter and up in summer.	\$ 0.05 million	20 million
<b>Landfill Gas</b>	Build a power plant that runs on landfill gas	\$13 million	80 million
<b>Natural Gas Power Plant Modernization</b>	Install new technology that will increase plant efficiency from 30-50%	\$5 million	20 million
<b>Solar Photovoltaic</b>	Hold meeting to encourage 3% of residents to install a solar photovoltaic systems	\$0.1 million	55 million
<b>Wind</b>	Install onshore wind turbines	\$ 10 million	30 million
	Install offshore wind turbine	\$ 48 million	150 million
<b>Total</b>		<b>\$76 million</b>	<b>355 million</b>

## Energy Pack 2: Cost Minimization

Tool	Project Description	Project Cost	Amount of Electricity Created Annually (KWh)
<b>Conservation</b>	Publish ads in the local paper encouraging the community to turn back thermostat 10°-15° in winter and up in summer.	\$ 0.05 million	20 million
<b>Hydroelectric Dams</b>	Build a new large dam	\$ 20 million	200 million
<b>Landfill Gas</b>	Build a power plant that runs on landfill gas	\$13 million	80 million
<b>Solar Photovoltaic</b>	Hold meeting to encourage 3% of residents to install a solar photovoltaic systems	\$0.1 million	55 million
<b>Total</b>		<b>\$33 million</b>	<b>355 million KWh</b>

## Energy Pack 3: Reliability Maximization

Tool	Project Description	Project Cost	Amount of Electricity Created Annually (KWh)
<b>Energy Conservation</b>	Distribute pamphlets to encourage the community to turn off the lights when they are not using them.	\$0.04 million	5 million
<b>Energy Efficiency</b>	Subsidize replacement of 5,000 pre 1993 refrigerators with new efficient ones	\$ 1 million	5 million
<b>Geothermal</b>	Build a geothermal power plant	\$ 2.3 million	10 million
<b>Hydroelectric Dams</b>	Build a new large dam	\$ 20 million	200 million KWh
<b>Landfill Gas</b>	Build a power plant that runs on landfill gas	\$13 million	80 million KWh
<b>Natural Gas Power Plant Modernization</b>	Install new technology that will increase plant efficiency from 30-50%	\$5 million	20 million KWh
<b>Wind</b>	Install onshore wind turbines	\$ 10 million	30 million KWh
<b>Total</b>		<b>\$51 million</b>	<b>350 million KWh</b>

## Project Descriptions: Homework 1

Fill out the following sheet by doing some internet research on the various energy sources. This will help you decide which tools you want to use.

Use the Tools as key words for searching. Some helpful websites include:

<http://www.need.org/infobooks.htm>

<http://www.eia.doe.gov/kids/>

<http://www.energyquest.ca.gov/story/index.html>

Tool	Description	Pros	Cons
<b>Energy Conservation</b>	Wasting less electricity		
<b>Energy Efficiency</b>	Using less electricity to do the same things		
<b>Geothermal</b>	Using hot and steamy groundwater to produce electricity		
<b>Hydroelectric Dams</b>	Converting kinetic energy in falling water into electricity		
<b>Landfill Gas</b>	Using gas emissions from landfills to produce electricity		
<b>Natural Gas Power Plant Modernization</b>	Making the existing power plant more efficient		
<b>Natural Gas Production</b>	Increase local natural gas production and power plant output		
<b>Solar Photovoltaic</b>	Creating electricity from sunlight using solar panels		
<b>Wind</b>	Using wind turbines to produce electricity		

## Pre-negotiation: Homework 2

Before you begin any negotiation, you should make some goals for the outcome of the negotiation. You should decide which tools you absolutely have to have, which ones you want, which ones you'd prefer not to have and the ones you absolutely don't want. Use your role description, the Energy Packs, Homework 1, and your research as a guide. Also, think about how you will justify to the other players what you should get what you want.

Use this as a guide during the negotiation to help you get the most out of the negotiation but make sure not to show it to the other participants.

Must Have	Try to Get

Must Avoid	Try to Avoid



## Eli Tricity, Gold Coast Power

You are the president and CEO of Gold Coast Power and are responsible for looking after the immediate and long-term financial well being of the corporation. You need to maximize profits, while keeping rates low for customers. You have the following responsibilities and tools to use:

**Renewable Portfolio Standard:** You are required by the State to increase the amount of renewable energy GCP sells to 20%, or by 180 million KWh. You are unsure what will happen if this goal is not met, which scares you, so make sure the solution includes at least 180 million KWh of renewable energy. The dam does not qualify as renewable energy.

**Rates:** You do not get to decide how much to charge your customers, the government does, so you need to work with them to negotiate retail rates that will make the company enough money to keep the shareholders satisfied but low enough to keep the customers happy as well. Any rise in energy prices will hurt your profitability unless you can raise your rates.

**Infrastructure Needs:** By increasing local energy production GCP stands to gain a lot financially because they will not have to import as much power, which is typically more expensive than local power. Therefore it is in GCP's best interest to develop as much energy from inexpensive sources as possible.

**You are willing to pay for:**

- **Both conservation and efficiency plans** - they are cheaper than producing the equivalent amount of energy, but you know that conservation is a hot ticket and there are likely others who would be willing to pay for those projects.
- **The geothermal plant**
- **The power plant modernization** - already in the planning phases, as it will allow GCP to produce more electricity from the same amount of natural gas and because GCP will save money on environmental permits because emissions per kilowatt hour will go down. No one else knows your plans, so you can use this as a bargaining chip. Ideally you would get the county to partly subsidize the modernization since it will improve air quality.
- **Onshore or offshore wind farm OR the hydroelectric dam** – These projects are all **very** expensive and you know that there are players out there who will help with the expenses so do not expose your willingness to pay on these projects. Get as much money from others as you can.

You will **NOT** invest in solar power because it is expensive and would prefer to build the offshore wind farm than the onshore because the wind is more powerful and consistent and there are federal grants to get the project started, but the dam is a **much** better investment than either one.